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10/772,290

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EXAMINER

PARSONS, THOMAS H

ART UNIT

PAPER NUMBER

1745

MAIL DATE

DELIVERY MODE

05/10/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/772,290 | Applicant(s) CHOI ET AL. | |
| | Examiner Thomas H. Parsons | Art Unit 1745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,8-10,13 and 14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,8-10,13 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

This is in response to the Amendment filed 7 March 2007.

(Previous) DETAILED ACTION.

Specification

1. The objections to the disclosure because of minor informalities have been **withdrawn** in view of Applicants' Amendment.

Claim Rejections - 35 USC § 112

2. The rejection of Claim 13 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention has been **withdrawn** in view of Applicants' Amendment.

Claim Rejections - 35 USC § 103

3. The rejections of claims 1-3, 8-10, and 13 under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (5,707,756) has been **withdrawn**.
4. The rejection of claim 14 under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. as applied to claim 9 above, and further in view of Parker et al. (6,692,873) has been **withdrawn**.

Response to Arguments

5. Applicant's arguments, filed 7 March 2007, with respect to 1-3, 8-10, and 13 have been fully considered and are persuasive. The rejections of the claims have been **withdrawn**.

(New) DETAILED ACTION

Specification

6. The disclosure is objected to because of the following informalities:
Amended Paragraph [0039], lines 6, suggest deleting "polytetrafluoroethylene (PTFE)".
Appropriate correction is required.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP10-302779 (hereafter JP'779).

Claim 1: JP10-302779 discloses a cathode active material comprising:

a lithium transition metal composite oxide in which a carbon compound is adsorbed (col. 15: 63-col. 17: 30).

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Because the method of thermally treating the lithium transition metal composite oxide of JP'779 while supplying CO₂ and O_s is similar to that instantly disclosed, the carbon would obviously be absorbed to obtain a carbon content of 10-1,000 ppm.

Claim 2: JP'779 discloses a lithium transition metal composite oxide expressed by the formula $\text{Li}_x\text{Ni}_y\text{M}_{(1-y)}\text{O}_2$ wherein M is at least one of a transition metal, and $0.05 \leq x \leq 1.10$ and $0.7 \leq y \leq 1.0$. Therefore, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have selected any transition metal, including Co and Mn to provide a lithium transition metal composite oxide selected from the group consisting of $\text{LiNi}_x\text{Co}_{1-x}\text{O}_2$ where $0 < x < y$, and $\text{LiNi}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_s$ wherein $0 < x < 1$, $0 < y < 1$, and $0 < x + y < 1$.

Claim 3: The rejection is as set forth in claim 1 wherein further, because the method of thermally treating the lithium transition metal composite oxide of JP'779 while supplying CO₂ and O_s is similar to that instantly disclosed the carbon compound would obviously have a specific surface area of 10-5,000 m²/g.

9. Claims 8-10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (5,707,758) in view of JP10-302779.

Claim 8: Inoue et al. in Figure 1 disclose lithium battery (col. 41: 63-col. 42: 15) comprising:

a cathode (5) comprising:

a cathode active material that comprises a lithium transition metal composite oxide (col. 15: 63-col. 17: 30);

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an anode (4) comprising a carbonaceous material to facilitate intercalating and deintercalating lithium ions (col. 15: 24-45);

a separator (3) interposed between the cathode and the anode;

an electrolytic solution (6) containing an electrolytic solute dissolved in a nonaqueous solvent (col. 12: 46-65); and

a current cut-off device (7) that operates in response to a rise in an internal pressure of the lithium battery (col. 36: 14-27; col. 37: 13-33; and, col. 39: 20-55).

Inoue et al. do not disclose a cathode active material that comprises a lithium transition metal composite oxide in which a carbon compound is adsorbed to obtain a carbon content of 10-1,000 ppm.

JP10-302779 discloses a cathode active material comprising:

a lithium transition metal composite oxide in which a carbon compound is adsorbed (col. 15: 63-col. 17: 30).

Because the method of thermally treating the lithium transition metal composite oxide of JP'779 while supplying CO₂ and O₂ is similar to that instantly disclosed, the carbon would obviously be absorbed to obtain a carbon content of 10-1,000 ppm.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the cathode active material with the cathode active material of JP10-302779 because JP10-302779 disclose a cathode active material that would have provided an active material having a high capacity and storage characteristics under high temperature conditions thereby improving the overall cycle life and performance of the battery.

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Claim 9: Inoue et al. in Figure 1 disclose a lithium battery (col. 41: 63-col. 42: 15) comprising:

- a cathode comprising:
 - a cathode active material that comprises a lithium transition metal composite oxide (col. 11: 10-53 and col. 15: 63-col. 17: 30);
 - an anode (4) comprising a carbonaceous material to facilitate intercalating and deintercalating lithium ions (col. 15: 24-45);
 - a separator (3) interposed between the cathode and the anode;
 - an electrolytic solution (6) containing an electrolytic solute dissolved in a nonaqueous solvent (col. 12: 46-65); and
 - a current cut-off device (7) that operates in response to a rise in an internal pressure of the lithium battery (col. 36: 14-27; col. 37: 13-33; and, col. 39: 20-55).

Inoue et al. do not disclose a cathode active material that comprises a lithium transition metal composite oxide in which a carbon compound is adsorbed to obtain a carbon content of 10-1,000 ppm and wherein the lithium transition metal composite oxide is at least one selected from the group consisting of LiNiO_2 , LiCoO_2 , LiMn_2O_4 , $\text{LiNi}_x\text{Co}_{1-x}\text{O}_2$ where $0 < x < 1$

JP10-302779 discloses a cathode active material comprising:

- a lithium transition metal composite oxide in which a carbon compound is adsorbed (col. 15: 63-col. 17: 30).

Because the method of thermally treating the lithium transition metal composite oxide of JP'779 while supplying CO_2 and O_2 is similar to that instantly disclosed, the carbon would obviously be absorbed to obtain a carbon content of 10-1,000 ppm.

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JP'779 discloses a lithium transition metal composite oxide expressed by the formula $\text{Li}_x\text{Ni}_y\text{M}_{(1-y)}\text{O}_2$ wherein M is at least one of a transition metal, and $0.05 \leq x \leq 1.10$ and $0.7 \leq y \leq 1.0$.

Therefore, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have selected any transition metal, including Co and Mn to provide a lithium transition metal composite oxide selected from the group consisting of $\text{LiNi}_x\text{Co}_{1-x}\text{O}_2$ where $0 < x < y$, and $\text{LiNi}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_s$ wherein $0 < x < 1$, $0 < y < 1$, and $0 < x + y < 1$.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the cathode active material with the cathode active material of JP10-302779 because JP10-302779 disclose a cathode active material that would have provided an active material having a high capacity and storage characteristics under high temperature conditions thereby improving the overall cycle life and performance of the battery.

Claim 10: The rejection is as set forth above in claim 8 wherein Inoue et al. do not disclose that the carbon compound has a specific surface area of $10\text{-}5,000 \text{ m}^2/\text{g}$. However, because the method of thermally treating the lithium transition metal composite oxide of JP'779 while supplying CO_2 and O_s is similar to that instantly disclosed the carbon compound would obviously have a specific surface area of $10\text{-}5,000 \text{ m}^2/\text{g}$.

Claim 13: Inoue et al. disclose that the separator is selected from the group consisting of a glass fiber, polyethylene, and, polypropylene (col. 20: 25-41).

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. in view of JP10-302770 as applied to claim 9 above, and further in view of Parker et al. (6,692,873).

Inoue et al. and JP10-302779 are as applied, argued and disclosed above, and incorporated herein.

Claim 14: Inoue et al. disclose that a polymer resin is utilized as a binding agent for the anode and the cathode (col. 18: 23-61) but are silent as to a vinylidene fluoride-hexafluoropropylene copolymer having 8-25% by weight of hexafluoropropylene.

Parker et al. disclose vinylidene fluoride-hexafluoropropylene copolymer having 8-25% by weight of hexafluoropropylene (col. 1: 43-56, col. 2: 43-50, col. 4: 32-48, and col. 10: 25-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the binder of the Inoue et al. combination by incorporating the binder of Parker et al. because Parker et al. teach a binder that would have formed uniform pores in the electrodes and separator, and provided excellent porosity characteristics and excellent adhesion between separator and electrodes thereby providing a battery having excellent lifetime characteristics, high performance, and low temperature characteristics.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H. Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER

Thomas H Parsons
Examiner
Art Unit 1745
